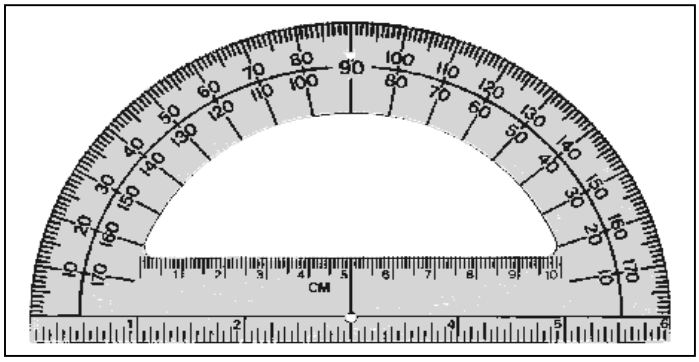
Activity #12: Math How Tall is the School Building? Angle of Elevation Project (Student version)

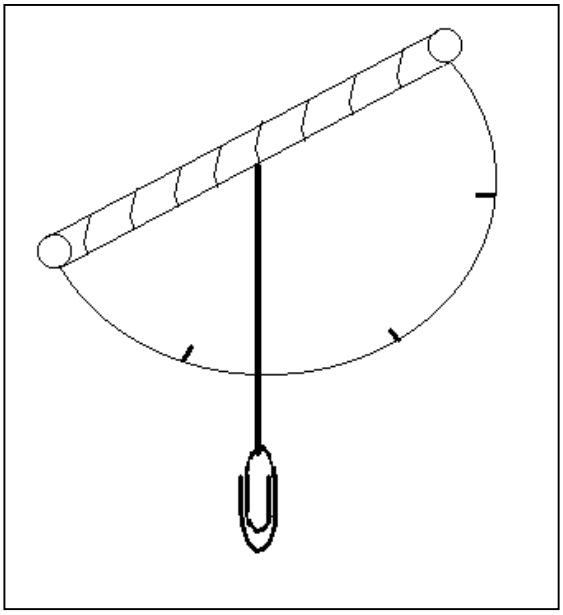
***Note to students*: Lab teams of two or three students are required for this activity.**

***Purpose*:**



- **To construct a hypsometer**
- **To use right triangle trigonometry**
- **To use indirect measurement to determine vertical height**
- **To establish best estimate of building's height**
- **To find the mean of gathered data**
- **To construct box and whisker plot on TI graphing calculator**

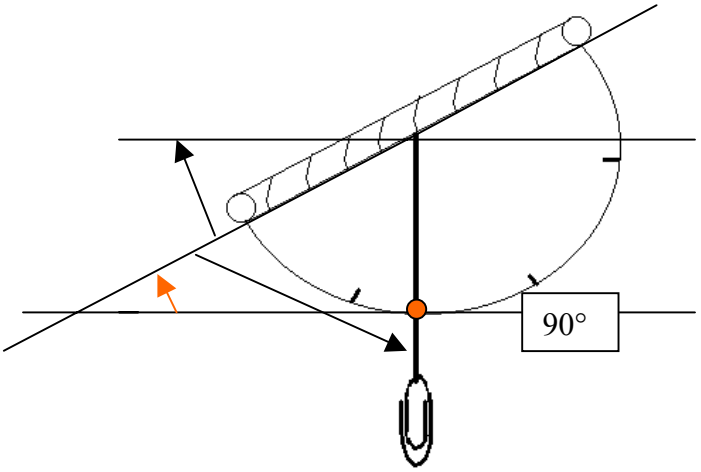
***Materials*: protractor, straw, string, paper clip, tape, 50-foot tape measure, TI graphing calculator**



***Activity Procedure*:**

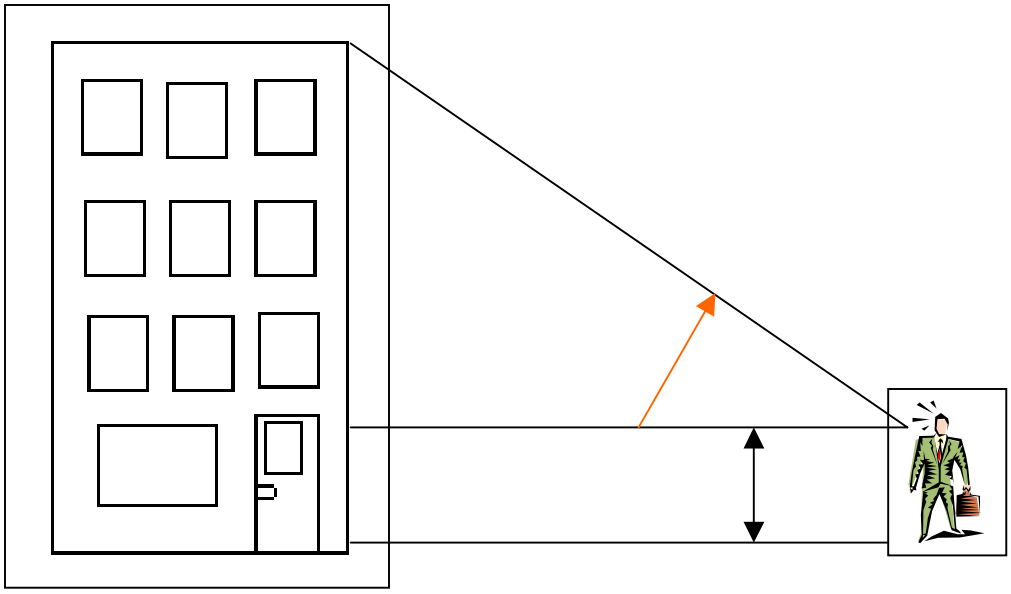
1. Construct hypsometer.
See diagram.
a. Attach straw to straight edge of protractor.
b. Tie length of string about 12" long to the center of the protractor's straight edge.
c. Attach paper clip to end of string. String must dangle freely.

2. Discuss the use of the hypsometer to find the angle of elevation.



As you look up to the top of your school building, the angle indicated by the red arrow is the angle of elevation. If you read the degree measure on the protractor at the point where the string dangles (red dot), how would you determine the angle of elevation?

3. Draw a picture of yourself, outside with your hypsometer looking up at the top of the school building. Look for any angles and/or distances for which you know or could determine by direct measurement.



4. Students go outside as a class to gather needed information to finish the activity. Show your work and circle what you determined to be the height of your school building.

Analysis and Extension:

1. Each team writes their building height on the board. Discuss discrepancies and why these might have occurred. What happened? _____

2. Determine "the class estimate" of the height of the school building from the gathered data. Show or explain work.

3. Create a box and whisker plot using the TI graphing calculator. Find mean from plot. Print the plot using the TI Graphlink.